

MEDT 475 - Clinical Hematology Practicum

COURSE SYLLABUS

INTRODUCTION

The clinical practicum is the culmination of several years of study. It is an exciting time for students, and offers unique experiences in the clinical laboratory setting. Students will achieve from this experience benefits comparable to the effort they put forth.

STUDENT LEARNING GOALS

Student learning goals for the clinical hematology practicum focus on active participation in daily laboratory operations and personal performance as a laboratory professional. Thus, the learning goal for the technical portion of the clinical hematology practicum is to facilitate and enhance the student's application of clinical hematology theory, laboratory experience, and test data interpretation learned in campus courses to an active clinical laboratory setting. To accomplish this goal, students will apply principles of pre-analytical, analytical, and post-analytical components of laboratory practice in clinical hematology to the performance of laboratory operations in a contemporary clinical setting. The learning goal for the professional component is for students to attain high level interpersonal performance so as to interact professionally with fellow staff and all consumers of laboratory testing. The ultimate outcome of a successfully completed practicum experience is the ability to perform testing of the highest quality to support the laboratory's role in quality patient care and safety. Student achievement during this practicum course will lay the foundation for success as an entry-level medical laboratory scientist.

GENERAL COURSE OBJECTIVES

Upon the completion of this course, based upon the objectives detailed in this document, the student must achieve a final minimum average of 70% on the assessment tools utilized in this course.

Upon successful completion of the clinical practicum, studying assigned materials, and reviewing materials associated with the course objectives from MEDT 375, 404/414, and 405/415, the student will:

1. Demonstrate correctly proper procedures for the collection, safe handling, and analysis of biological specimens to the satisfaction of the instructor.
2. Utilize correctly scientific principles, principles of methods for quantifying, clinical correlations, and clinical decision making for analytes of interest in clinical hematology.
3. Perform correctly laboratory testing according to established laboratory protocol.
4. Apply correctly appropriate problem solving steps for determining instrument/methodology problems, utilizing instrument manuals, laboratory procedure manuals, and information contained in package inserts.
5. Operate equipment properly, troubleshoot, and perform preventive and corrective maintenance according to the manufacturer's direction to the satisfaction of the instructor.

6. Utilize proper techniques in the performance of all laboratory testing to the satisfaction of the instructor.
7. Evaluate correctly laboratory test results to determine disease diagnosis.
8. Evaluate correctly acceptability of quality control and test result data.
9. Discuss the impact and apply principles of total quality management on laboratory operations, including relevance to the pre-analytical, analytical, and post-analytical stages of the testing process.
10. Comply with established safety regulations and regulations governing regulatory compliance related to laboratory practice to the satisfaction of the instructor.
11. Assess correctly critical pathways to facilitate diagnosis and to determine additional testing as warranted.
12. Communicate effectively and professionally as a member of the healthcare team to enable consultative and educational interactions with other healthcare personnel, the public, and patients to the satisfaction of the instructor.
13. Demonstrate ethical behavior and professionalism, including maintaining the confidentiality of patient information to the satisfaction of the instructor.
14. Participate in continuing education as opportunities arise for one's own professional career development to the satisfaction of the instructor.

OUTCOME EXPECTATION FOR STUDENTS BASED ON UNIVERSITY, PROGRAM, AND COURSE STUDENT LEARNING GOALS AND OBJECTIVES

The student learning goals and objectives, as stated for MEDT 475 Clinical Hematology Practicum, provide the foundation for student achievement of the Medical Laboratory Science Program's student learning goals and objectives. Achievement of the Program's combined goals and objectives is necessary for students to gain the knowledge needed to be successful entry-level medical laboratory scientists, as well as successful on passing the Board of Certification national examination. Additionally, the Medical Laboratory Science Program's student learning goals and objectives support student accomplishment of the University's general education goals for undergraduate students. The University's general education goals support a comprehensive understanding of the liberal arts and sciences, fostering student development for success in an increasingly challenging global society. The synergy for this collaborative educational effort is expressed in the table entitled "University and MLS Program Educational Goals and Objectives".

University and MLS Program Educational Goals and Objectives

UNIVERSITY GENERAL EDUCATION GOALS	MLS PROGRAM OBJECTIVES, SUPPORTING GEN ED GOAL(S) GED ED #:	MEDICAL LABORATORY SCIENCE PROGRAM EDUCATION OBJECTIVES	MEDT475 COURSE OBJECTIVE(S) SUPPORTING MLS ED OBJECTIVES COURSE OBJ #
1 -Read critically, analyze arguments & information, & engage in constructive ideation.	5	1 -Demonstrate proper procedures for the collection of safe handling & analysis of biological specimens.	1
2 -Communicate effectively in writing, orally, & through creative expression.	5	2 -Utilize scientific principles (e.g. physiology, immunology, biochemistry, molecular biology, genetics, microbiology, etc.), laboratory principles and methodologies for the clinical setting.	2
3 -Work collaboratively & independently within & across a variety of cultural contexts and a spectrum of differences.	5	3 -Perform laboratory testing with accuracy.	3
4 -Critically evaluate the ethical implications of what they say and do.	1,3	4 -Evaluate problems that impact on laboratory services and take corrective action.	4
5 -Reason quantitatively, computationally, and scientifically.	1,5	5 -Operate equipment properly, troubleshoot, and perform preventive and corrective maintenance.	5
	5	6 -Utilize proper technique in the performance of all laboratory testing.	6
	1,5	7 -Interpret clinical significance, clinical procedures, & laboratory test data accurately.	2, 7, 11
	5	8 -Evaluate laboratory data using statistical analysis.	8
	1,5	9 -Apply principles of continuous assessment to all laboratory services.	9
	1,2,5	10 -Utilize principles of quality assurance and quality improvement for all phase of laboratory services (i.e. pre-analytical, analytical, & post-analytical).	9
	2,4	11 -Comply with established laboratory safety regulations & regulations governing regulatory compliance related to laboratory practice.	10
	2,3	12 -Communicate through oral and written skills effectively & professionally to enable consultative & educational interactions with healthcare personnel, the public, & patients in order to function successfully as a member of the healthcare team.	12
	4	13 -Demonstrate ethical behavior & professionalism, maintain confidentiality of patient information, & participate in continuing education for one's own professional career development.	13, 14
	2,3	14 -Apply principles of educational methodology to educate providers & users of laboratory services.	N/A
	1,5	15 -Evaluate published scientific studies utilizing knowledge of research design.	N/A
	1,2,3,5	16 -Apply principles & concepts of laboratory operations to critical pathways and clinical decision making, performance improvement dynamics of healthcare delivery systems in relationship to laboratory services, human resource management & financial management.	11
	1,3	17 -Demonstrate a commitment to the future of medical laboratory profession through involvement in a national professional society.	N/A
	1,2,3	18 -Demonstrate an understanding of human creativity & of various types of aesthetic & intellectual expression through study of the liberal arts.	N/A
	1,3	19 - Demonstrate an understanding of the significance of cultural diversity as exhibited within the United States through study of the liberal arts including completion of a multicultural course.	N/A
	1,3	20 -Demonstrate an understanding of the impact of globalization on society through study of the liberal arts.	N/A

COURSE DETAILS

This is a clinical practicum course, and it will meet at a clinical affiliate to be determined by the University instructor. Students will be notified of this location prior to the commencement of the clinical practicum. **Attendance at all clinical practicums is MANDATORY, and missed time must be rescheduled with the date/time at the discretion of the clinical instructor and the University instructor. See <http://sites.udel.edu/mls/clinical-practicum-schedule/> for further details about attendance expectations.**

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MODES OF INSTRUCTION

Clinical faculty will utilize various methods of instruction, including but not limited to a combination of:

- Clinical specimens
- Quality control materials
- Hematology and coagulation automated analyzers
- Preserved normal and abnormal peripheral blood and bone marrow slides with histograms and case histories
- CAP disease state/case study kodachromes
- Case studies

Students will receive instruction about proper operation of equipment, specimen processing, quality control, use of the LIS, and result interpretation and reporting mechanisms specific to the clinical facility where they are assigned.

METHODS OF ASSESSMENT

Upon the completion of this course, based upon affective, cognitive and psychomotor objectives, the student must achieve a final minimum average of 70% (C-) on the assessment tools utilized in this course.

The clinical instructor will administer written quizzes. In addition, the clinical instructor will assign papers or projects that are relevant to the practicum. This component of the Evaluation comprises 40% of the practicum grade.

A practical examination is another means of assessment employed by the clinical instructor. The instructions and rubric for the practical examination will be provided to the student prior to commencing the practical examination. The clinical instructor will complete the practical grading rubric and will return it to the University instructor. This component of the Evaluation comprises 40% of the practicum grade.

Affective assessment is incorporated into the mid- and final-evaluation process. A mid-evaluation will be completed by the clinical instructor and will be discussed with the student. If there are any issues to be addressed, this will also be shared with the University instructor. The final MEDT 475 Clinical Hematology Practicum Evaluation will be completed by the clinical instructor and discussed with/reviewed by the student. The affective component on the final Evaluation comprises 20% of the practicum grade.

A written final examination will be administered by the University instructor at the conclusion of the practicum. The University-administered written final examination component of the Evaluation does not affect the practicum grade, but is included on the form.

A sample MEDT 475 Clinical Hematology Practicum Evaluation can be found at the end of this syllabus.

Additional Requirements

Journals are one of the most frequently prescribed methods of reflecting on lifetime experiences. Each student is required to maintain a journal for each clinical practicum period. The student may record the sequence of daily events, as well as unusual or memorable situations or events that transpired and how he/she reacted to them. Think about what happened. How would you react the next time you encounter a similar situation? Or perhaps provide a commentary about a particular laboratory employee or environment that you encounter. Think about how your day impacted you professionally. Write regularly and record the date of each entry. Adhere to HIPAA and confidentiality guidelines; do not disclose any identifying facts or information. For more information and guidelines for the journal, see:

<http://sites.udel.edu/mls/clinical-practicum-evaluation/>

Paperwork documenting attendance and orientation to the affiliate institution must be submitted to the University instructor at the conclusion of the practicum. Note that the attendance sheet must be signed by the Clinical instructor prior to completion of the practicum.

Site evaluations are a tool used by the Clinical and University instructors to assess the achievement of the clinical practicum experience and the academic preparation for it. Students are required to submit a completed Site Evaluation for each clinical practicum to the University instructor. These will be collated by affiliate institution and discipline, and will be provided in an anonymous format to the Clinical instructors during the summer following completion of the clinical practicums. Comments regarding academic preparation will be shared and discussed with the University instructors, and used to enhance the curriculum as indicated.

COURSE PREREQUISITES

MEDT 405/415

RESTRICTIONS:

Open to medical laboratory science majors only.

TEXTBOOKS AND OTHER RESOURCES

One of the following review books is required for all clinical practicums senior year and should be taken daily to your clinical practicum sites for review during slower periods:

Ciulla AP, Lehman DL. *Success! In Clinical Laboratory Sciences*. 4th ed. Upper Saddle River, NJ: Pearson Education, Inc.; 2010. ISBN: 978-0-13-512648-6

Tanabe, Patricia A., Holladay, E. Blair., eds. *BOC Study Guide: Clinical Laboratory Certification Examinations*. 5th ed. Chicago, Ill.: American Society For Clinical Pathology, 2014, c2009. Print. ISBN: 978-089189-5879

Students should refer to the textbook and lecture and laboratory course materials from MEDT 375, MEDT 404/414, and MEDT 405/415. Students are expected to review these materials in preparation for this clinical practicum experience. In addition, students are expected to use these materials as resources during this practicum, as well as in preparation for the written final examination.

Students also have access to the reference library at the affiliate institution. This library provides students access to journals and medical-related books.

Through the University of Delaware, students have online access to DELCAT-UD's library online catalog <https://library.udel.edu/>

DRESS CODE

All University of Delaware Medical Laboratory Science majors assume responsibility for their own attire while in the clinical setting. Each site has established guidelines for employee/students. In addition to abiding by the guidelines of the site at which the rotation occurs, each student must adhere to the following minimum guidelines of the University of Delaware Medical Laboratory Science Program described below.

- Navy medical scrub uniforms are required. Clothing must be neatly pressed and colors must

match. Hose or socks are required when wearing pants. Female students must wear neutral or white stockings/panty hose when wearing a skirt. White shoes are recommended; flat shoes are required. Cloth or open-toed shoes, jeans, and sweat shirts are not acceptable.

- A clean, white labcoat is required unless otherwise specified by the clinical site. A University of Delaware pin with your name, denoting status as a University of Delaware student must be worn at all times while at the clinical site.
- Safety glasses must be worn while in the clinical laboratory as per University of Delaware requirements.
- Hair styles which extend below the shoulder must be tied back.
- For safety reasons, most jewelry is limited. Small post earrings that do not extend below the ears are acceptable, long necklaces or dangling bracelets are not. Facial, ear cartilage and tongue piercings must be removed while at the affiliate institution. Tattoos that are visible must be covered.
- The various clinical sites may have additional dress code requirements. The student must adhere to any additional requirements at that site.
- Each student is expected to present a professional appearance and attitude at all times. NO EXCEPTIONS!!

ACADEMIC HONESTY

Honesty is essential in the profession of Medical Laboratory Science. You are encouraged to become familiar with the UD Student Guide to University Policies <<http://www.udel.edu/stuguide/current>>. The content of the handbook applies to this course. If you have any questions about this policy please consult with the instructor.

ACADEMIC SERVICES

The University of Delaware offers a variety of academic services for students. These services include coordinating tutoring sessions, providing academic skills workshops, and providing assistance for students with ADHD and learning disabilities. Students are encouraged to contact the Academic Enrichment Center at 831-2805 or <<http://www.aec.udel.edu>> to take advantage of these services.

AFFECTIVE OBJECTIVES

The following objectives have been listed as general affective objectives, since they apply to the overall performance and participation by the student during clinical rotations at the affiliate institutions. Among other qualities, the student is expected to demonstrate dependability, organizational skills, time efficiency and the ability to work with others in accordance with a professional program of study. As a member of the health care team, it is expected that the student will maintain an appropriate professional demeanor at all times.

During the clinical rotations and upon completion of the program of study in Medical Laboratory Science, the student will:

1. Comply with the established dress code policy as outlined in the clinical practicum manual.
2. Report to the laboratory at the scheduled time.
3. Notify the Clinical Coordinator and the University Education Coordinator when unable to report to the clinical practicum.
4. Comply with the attendance policy as outlined in the clinical practicum manual.
5. Comply with instructions given either orally or written.
6. Demonstrate the ability to ask pertinent questions or for assistance if needed.
7. Demonstrate the ability to work independently within student guidelines.
8. Communicate courteously, effectively and professionally with instructors, laboratory staff, other health care personnel, patients and visitors.
9. Demonstrate interest and enthusiasm for the clinical laboratory science profession.
10. Accept evaluation of performance as constructive when offered by instructors and other laboratory personnel, and follow through with suggestions made.
11. Adhere to laboratory safety regulations in each clinical area.
12. Maintain a clean, organized work area.
13. Utilize reagents and supplies judiciously.
14. Replenish supplies required in the laboratory work area.
15. Demonstrate self-confidence in the operation of equipment and in the performance of laboratory procedures.
16. Report patient laboratory results only to authorized personnel.
17. Maintain the confidentiality of all privileged information.
18. Cooperate with other laboratory personnel to create a pleasant and efficient work environment.
19. Demonstrate the ability to concentrate on the laboratory test procedure being performed and the need to avoid distractions.
20. Demonstrate organizational skills through ability to coordinate the quantity of work needed to be done with the time available for its completion.
21. Practice acceptable quality assurance as established for each clinical area.
22. Defend the policy of running quality control samples according to laboratory protocol.
23. Coordinate theory with laboratory analysis to appropriately judge patient data.
24. Offer assistance to other laboratory personnel when scheduled assignment is complete.
25. Recognize technical problems and plan possible corrective action.
26. Maintain composure and work quality under stressful conditions.
27. Demonstrate concern for professional self-image and that of the medical laboratory science profession by practicing ethical behavior, participating in professional activities and attending professional seminars to maintain knowledge base.

COURSE OBJECTIVES RELATED TO SPECIFIC CONTENT AREAS

Upon the completion of this course, based upon the objectives detailed in this document, the student must achieve a final minimum average of 70% on the assessment tools utilized in this course.

- I. **Professionalism**
- II. **Specimen Management/Safety**
- III. **Quality Control / Quality Assessment / Total Quality Management**
- IV. **Automated Hematology/Coagulation Instrumentation**
- V. **Differentials, RBC Morphology and RBC & WBC Disorders**
- VI. **Body Fluids**
- VII. **Routine and Miscellaneous Hematology Procedures**
- VIII. **Coagulation**
- IX. **Molecular Diagnostic and Immunologic Assays**

I. PROFESSIONALISM

Introduction

The student is expected to conduct himself/herself in a professional manner at all times. The ability to communicate in a respectful manner under all circumstances is an expectation of a professional. The student must remember that all patient information is privileged and as such strict confidentiality must be maintained. The student should realize that in some ways his/her education is just beginning, and to remain current during the work years ahead, it is important to participate in continuing education activities on a routine basis. If continuing education activities are available at the affiliate institution during the practicum, it is expected that the student will avail himself/herself of the opportunity. Professional performance is guided by the affective objectives previously listed, and professional behavior is evaluated using the form located at the end of this syllabus.

Objectives

Upon successful completion of the clinical practicum, studying assigned materials, and reviewing materials associated with the course objectives from MEDT 375, 404/414, 405/415, and 461/471, the student will:

1. Communicate effectively and professionally as a member of the healthcare team to enable consultative and educational interactions with other healthcare personnel, the public, and patients to the satisfaction of the instructor.
2. Demonstrate ethical behavior and professionalism to the satisfaction of the instructor.
3. Maintain confidentiality of patient information to the satisfaction of the instructor.
4. Participate in continuing education as opportunities arise for one's own professional career development to the satisfaction of the instructor.

Note: Review affective objectives and affective evaluation form.

II. SPECIMEN MANAGEMENT/SAFETY

Introduction

Thorough knowledge of safety procedures is essential before performing any duties in the clinical the proper collection and handling of specimens. The hematology department is responsible for monitoring departmental criteria for specimen acceptance, processing of various testing, evaluating and reporting laboratory results. Specimen handling involves the following steps: proper specimen collection, appropriate specimen containers, accurate labeling of forms and specimens, timeliness of transport, and proper storage upon completion of analysis. These pre-analytical, analytical, and post-analytical factors are essential for quality assessment in the laboratory. The following precautions or conditions are essential for quality specimens:

- correct identification of patient
- correct labeling of specimen
- correct identification of the state of the patient – fasting, nonfasting, etc.
- correct time for specimen collection as applicable
- correct specimen type – anticoagulants, preservatives
- correct special handling – specimen rocker, etc.
- correct storage conditions

Prerequisite

The student will familiarize herself/himself with the overall management of the Hematology Department.

Objectives

Upon successful completion of the clinical practicum, studying assigned materials, and reviewing materials associated with the course objectives from MEDT 375, 404/414, and 405/415, the student will:

1. Discuss the specimen management system used by the hematology laboratory.
2. Distribute specimens to workstations appropriately to the satisfaction of the instructor.
3. State the tests performed at each station or instrument in the hematology laboratory (e.g., Automated Hematology Instruments, Manual Methods, Automated Coagulation Instruments, Differentials, etc.).
4. Evaluate correctly specimens for acceptance or rejection using laboratory guidelines.
5. Document correctly specimen rejection according to laboratory guidelines.
6. Report and/or call test results according to laboratory protocol to the satisfaction of the instructor.
7. Maintain correctly patient records according to laboratory protocol.
8. File correctly patient records according to laboratory protocol.
9. Utilize correctly safe techniques in handling and disposal of infectious materials according to laboratory protocol.
10. Comply with established safety regulations and regulations governing regulatory compliance related to laboratory practice to the satisfaction of the instructor.

III. QUALITY CONTROL / QUALITY ASSESSMENT / TOTAL QUALITY MANAGEMENT

Introduction

Quality is of utmost importance in every laboratory. Today's laboratories have a variety of programs in place to control, assess, and improve their quality.

Prerequisite

The student should read the department's quality control (QC), quality assessment (QA), total quality management (TQM) and/or continuous quality improvement (CQI) policies.

Objectives

Upon successful completion of the clinical practicum, studying assigned materials, and reviewing materials associated with the course objectives from MEDT 375, 404/414, and 405/415, the student will:

1. Explain the rationale for departmental quality assessment and/or total quality management

- programs.
2. List specific areas which require surveillance.
 3. Demonstrate correctly how the performance of specific reagents are evaluated and how often.
 4. Discuss the necessity of keeping written records of all surveillance.
 5. Discuss the importance of periodic review of surveillance records and documentation of corrective actions taken.
 6. Compare and contrast quality control, quality assessment, and total quality management.
 7. Evaluate correctly laboratory QC data according to laboratory protocol.
 8. Demonstrate the ability to identify appropriate corrective action when data falls out of control range to the satisfaction of the instructor.
 9. Discuss how QC is monitored and recorded for each procedure in the hematology laboratory.
 10. Record correctly QC data according to laboratory guidelines.
 11. Identify QC shifts and trends when given laboratory data to analyze, suggesting corrective action.
 12. Explain the purpose of proficiency testing.
 13. Discuss the impact of total quality management on laboratory operations, including relevance to the pre-analytical, analytical, and post-analytical stages of the testing process.
 14. Apply correctly principles of total quality management on laboratory operations, including relevance to the pre-analytical, analytical, and post-analytical stages of the testing process.
 15. Discuss the role of the medical laboratory scientist in maintaining laboratory quality.

IV. AUTOMATED HEMATOLOGY/COAGULATION INSTRUMENTATION

Introduction

Automated hematology/coagulation analyzers are the workhorse of the hematology/coagulation laboratory. While instruments vary by manufacturer and type, the following basic objectives remain the same for each analyzer.

Prerequisites

The student should review the Automated Hematology Analyzer Instrument Manuals, Coagulation Analyzer Instrument Manuals, Slide Stainer Instrument Manuals, and Flow Cytometry Instrument Manuals for those instruments that will be employed during the practicum period.

Automated Cell Counters and Coagulation Instrumentation

Objectives

Upon successful completion of the clinical practicum, studying assigned materials, and reviewing materials associated with the course objectives from MEDT 375, 404/414, and 405/415, the student will:

1. Operate correctly the automated cell counter(s) according to the manufacturer's directions to produce accurate quality control and patient results.
2. Operate correctly the coagulation instrument(s) according to the manufacturer's directions to produce accurate quality control and patient results.
3. Record correctly quality control data according to laboratory protocol.
4. Evaluate correctly quality control data according to laboratory protocol.
5. Evaluate correctly inaccurate instrument results, including a discussion of steps to correct the problem.
6. Correlate correctly patient results with clinical significance (e.g., impact on diagnosis or treatment of associated disease) and clinical decision making.
7. Assess critical pathways to facilitate diagnosis and to determine additional testing as warranted to the satisfaction of the instructor.
8. Identify the basic operating components of the analyzer(s).
9. Locate the basic operating components of the analyzer(s) to the satisfaction of the instructor.
10. Explain the function of each component of the analyzer(s).
11. Perform routine daily maintenance on the analyzer(s) according to the manufacturer's directions to the satisfaction of the instructor.
12. Identify periodic (weekly, monthly, etc.) maintenance requirements according to the manufacturer's directions to the satisfaction of the instructor.
13. Explain the function of each reagent used on the automated cell counter(s) and coagulation instrument(s).

15. State how reagents are stored when not in use on the analyzer.
16. State the calibration schedule (frequency) for calibrating the analyzer(s).
17. Describe the procedure(s) for calibration of the analyzer(s) according to the manufacturer's directions.
18. Perform correctly calibration(s) as required according to the manufacturer's directions.
19. Explain where to find basic troubleshooting information about the analyzer.
20. Participate in troubleshooting the analyzer(s) as appropriate to the satisfaction of the instructor.
21. Apply appropriate problem solving steps for determining instrument/methodology problems, utilizing instrument manuals, laboratory procedure manuals, and information contained in package inserts to the satisfaction of the instructor.
22. Justify the importance of documenting maintenance, quality control, and troubleshooting.

Slide Stainer

Objectives

Upon successful completion of the clinical practicum, studying assigned materials, and reviewing materials associated with the course objectives from MEDT 375, 404/414, and 405/415, the student will:

1. Perform correctly an adjustment of the stain, buffer, and rinse on the laboratory stainer as indicated according to the manufacturer's directions.
2. Produce a quality-stained blood smear to the satisfaction of the instructor.
3. Explain the function of each reagent used on the automated slide stainer.
4. Prepare correctly reagents for use on the slide stainer according to the manufacturer's directions.
5. State how reagents are stored when not in use on the slide stainer.

Flow Cytometry Instrumentation (When a Flow Cytometer is not available at the clinical site, students should refer to their text for review.)

Objectives

Upon successful completion of the clinical practicum, studying assigned materials, and reviewing materials associated with the course objectives from MEDT 375, 404/414, and 405/415, the student will:

1. Discuss the basic principle of flow cytometry, including information obtained from forward and side scattered light.
2. List common fluorescent dyes used in flow cytometry.
3. Discuss hematological applications of flow cytometry.
4. Discuss cellular applications of flow cytometry.
5. Discuss flow cytometry markers used in the differentiation of various leukocytic disorders.
6. Operate correctly the flow cytometer according to the manufacturer's directions, producing accurate quality control and patient results.

V. DIFFERENTIALS, RBC MORPHOLOGY AND RBC & WBC DISORDERS

Introduction

The differential measures the percentage of each type of white blood cell in the peripheral blood. Evaluation and interpretation of red blood cell morphology is an important component that accompanies the performance of a differential.

Prerequisite

The student should review the laboratory procedure manual for determination of when automated differentials need to be reviewed and the grading system used for evaluating red blood cell morphology.

Objectives

Upon successful completion of the clinical practicum, studying assigned materials, and reviewing materials associated with the course objectives from MEDT 375, 404/414, and 405/415, the student will:

1. Identify all the cells in the myelocytic, monocytic, and lymphocytic series.
2. Discuss the major characteristics pertinent to each of the cells in the myelocytic, monocytic, and lymphocytic series.
3. Compare and contrast all of the cells in the erythroid series.
4. Differentiate among the following: eosinophils, basophils, lymphocytes, monocytes.
5. Differentiate among the following: reactive lymphocytes, plasma cells, lymphoblasts.
6. Differentiate platelets from other cells on a Wright's Stained blood smear.
7. Perform correctly a successful platelet estimate from the Wright's Stained blood smear.
8. Prepare good wedge smears and buffy coat preparations to the satisfaction of the instructor.
9. Prepare a good manual stained slide to the satisfaction of the instructor.
10. Judge correctly if the white count matches what is seen on the smear.
11. Distinguish abnormal platelet shapes and large platelets.
12. Explain the significance of abnormal platelet shapes and large platelets.
13. Calculate correctly a corrected white count, based on the number of NRBC seen on the smear.
14. Differentiate correctly the following on a Wright Stain smear:
 - o sickle cells
 - o acanthocytes
 - o echinocytes
 - o ovalocytes
 - o elliptocytes
 - o schistocytes
 - o target cells
 - o spherocytes
 - o macrocytes
 - o microcytes
 - o teardrop cells
 - o stomatocytes.
15. Grade correctly the items in objective #14 on a Wright Stain smear.
16. Examine correctly a blood smear for RBC morphology, assessing and grading the following:
 - o polychromasia
 - o basophilic stippling
 - o Howell-Jolly bodies
 - o Pappenheimer bodies
 - o hypochromia
17. Identify correctly malarial parasites.
18. Assess correctly a blood smear for rouleaux.
19. Differentiate correctly between normal and hypersegmented PMNs on a blood smear.
20. Explain the significance of normal and hypersegmented PMNs on a blood smear.
21. Examine correctly a stained smear to determine if the RDW (Red Cell Distribution Width) is correct.
22. Examine correctly a Wright's stained blood smear for toxic granulation and Dohle bodies.
23. Explain the significance of toxic granulation and Dohle bodies on a Wright's stained blood smear.
24. Differentiate vacuolation in PMNs from other intra cellular structures.
25. Explain the significance of vacuolation in PMNs from other intra cellular structures.
26. Distinguish between normal and pyknotic PMNs.
27. Explain the significance of normal and pyknotic PMNs.
20. Identify correctly smudge cells on a Wright's stained blood smear.
21. Interpret RBC and WBC abnormalities in relation to pathological conditions.
22. Perform correctly differentials and grading of red cell morphology according to laboratory protocol.
23. Compare and contrast three pathways of RBC metabolism identifying key intermediates as well as the relationship of each to RBC survival and longevity.
24. Discuss the function of ATP production as it relates to the RBC.
25. Discuss Auer rods in terms of their appearance, composition, staining properties, and type of leukemia they are found in.
26. Calculate RBC indices predicting what is expected on the peripheral blood smear.

27. Explain the metabolic link that B₁₂ and folic acid share indicating why a deficiency in either would result in megaloblastic maturation.

VI. BODY FLUIDS

Introduction

Enumeration and identification of cellular components of body fluids are needed for characterization of inflammatory, infectious, neoplastic and immune alterations.

Prerequisite

The student should review the laboratory procedure manual for reporting of body fluid results.

Objectives

Upon successful completion of the clinical practicum, studying assigned materials, and reviewing materials associated with the course objectives from MEDT 375, 404/414, and 405/415, the student will:

1. Determine the body source of each of the following fluids:
 - o CSF
 - o synovial
 - o pleural
 - o peritoneal
 - o pericardial
 - o thoracentesis
2. Determine color and clarity of each body fluid specimen and explain their significance.
3. Determine:
 - o the number of tubes normally taken for CSF (3-4).
 - o which tubes go to which department and why.
4. Perform correctly a cell count on the following CSF:
 - o clear & colorless
 - o slightly hazy and colorless
 - o cloudy and white
 - o cloudy and red
 - o grossly bloody
 - o amber and clear
5. Explain how to determine if a specimen was a bloody tap.
6. Explain the significance of a 500:1 RBC to WBC ratio.
7. Determine when a dilution is necessary.
8. Determine what dilution to make.
9. Multiply correctly the number of cells counted by the dilution factor to get an accurate result.
10. Make correctly a cytospin preparation from body fluids, staining smears to the satisfaction of the instructor.
11. Examine correctly a prepared smear of a body fluid, identifying the cells present.
12. Examine correctly cytospin preparations.
13. Identify correctly the cell types present.
14. State the common characteristics (e.g., cell type) of:
 - o viral meningitis
 - o bacterial meningitis.
15. Explain why it is important to differentiate between viral meningitis and bacterial meningitis.
16. Discuss the reasons why CSF from leukemic patients should always have a cell count and differential (or cytospin if available).
17. Explain the significance of crenated RBC in CSF.
18. Explain why body fluid cell counts should be performed immediately upon arrival in the laboratory.
19. Distinguish a CSF that is contaminated with bone marrow.
20. Explain "xanthochromia" in body fluids, including the clinical significance of its presence.
21. Explain the general characteristics of malignant cells.
22. Perform correctly a cell count on various body fluids (e.g., synovial, pleural, peritoneal, pericardial).

VII. ROUTINE AND MISC. HEMATOLOGY PROCEDURES

Introduction

Various hematology procedures can provide additional information with regard to erythroid, leukocytic and platelet pathophysiology.

Prerequisite

The student should review the laboratory procedure manual for performance and reporting of test results.

Erythrocyte Sedimentation Rate

Objectives

Upon successful completion of the clinical practicum, studying assigned materials, and reviewing materials associated with the course objectives from MEDT 375, 404/414, and 405/415, the student will:

1. State the normal erythrocyte sedimentation rate (ESR) reference ranges for an adult male, adult female, and children.
2. Discuss the procedure involved in setting up an ESR.
3. Discuss anemia and its relationship to the ESR.
4. Explain how coldness of the blood, polycythemia, rouleaux, and agglutination will affect the ESR.
5. Explain how certain RBC shapes cause a decreased ESR.
6. Examine correctly whether a specimen is acceptable for an ESR determination.
7. Evaluate the ESR as a diagnostic tool.
8. Perform correctly an ESR according to laboratory protocol.

Reticulocyte Counts

Objectives

Upon successful completion of the clinical practicum, studying assigned materials, and reviewing materials associated with the course objectives from MEDT 375, 404/414, and 405/415, the student will:

1. Explain the procedure used in staining reticulocytes.
2. Describe the method for counting the reticulocytes.
3. Describe how to calculate the percent of reticulocytes.
4. Discuss the implications of considering only the % reticulocytes rather than the absolute number of reticulocytes.
5. Clarify the type of stain that is used to stain reticulocytes.
6. Describe the significance of this type of stain.
7. Discuss the role of reticulocytes; include shift macrocytosis, response to stress, and normal reference range.
8. Compare polychromasia on a smear to the reticulocyte count.
9. Explain the importance of proper mixing of the specimen immediately before the smears are made.
10. Discuss the clinical implications of the immature reticulocyte fraction (IRF).
11. Perform correctly a reticulocyte count according to laboratory protocol.

Sickle Cell

Objectives

Upon successful completion of the clinical practicum, studying assigned materials, and reviewing materials associated with the course objectives from MEDT 375, 404/414, and 405/415, the student will:

1. Explain the principle involved in solubility tests that analyze for the presence of sickling hemoglobin.
2. Describe the technique and method used to set up a sample for a Sickle Solubility Test.
3. Describe a quality control procedure that is acceptable for the above procedures.
4. Discuss the importance of the Hemoglobin-S concentration in the solubility tests and the need to adjust for a low hemoglobin.

5. Perform correctly a solubility test that will analyze for the presence of sickling hemoglobin following the procedure according to the manufacturer's directions.

Glucose-6-Phosphate Dehydrogenase Screen

Objectives

Upon successful completion of the clinical practicum, studying assigned materials, and reviewing materials associated with the course objectives from MEDT 375, 404/414, and 405/415, the student will:

1. Discuss the principle of the glucose-6-phosphate dehydrogenase (G6PD) screening test, including the clinical significance of a positive screening test.
2. Discuss the problems involved with the test when using blood from a patient that has been transfused.
3. Evaluate problems involved with the test when using blood from a patient that has a high percentage of reticulocytes, e.g., after a hemolytic episode.
4. Discuss the function and importance of G6PD in the Hexose Monophosphate Shunt.

Bone Marrows

Objectives

Upon successful completion of the clinical practicum, studying assigned materials, and reviewing materials associated with the course objectives from MEDT 375, 404/414, and 405/415, the student will:

1. State the site from which bone marrow is most commonly aspirated.
2. Review the general procedure of bone marrow aspiration.
3. Explain the technique used by the Hematology technologists in preparing bone marrow smears and staining procedures.
4. Define hypoplasia and hyperplasia of the bone marrow.
5. State the normal myeloid:erythroid ratio of the bone marrow.
6. Participate in as many bone marrow aspirations as possible to the satisfaction of the instructor.
7. Examine at least one bone marrow sample under the microscope to the satisfaction of the instructor.

Cytochemical Stains

Objectives

Upon successful completion of the clinical practicum, studying assigned materials, and reviewing materials associated with the course objectives from MEDT 375, 404/414, and 405/415, the student will:

1. Discuss the purpose for performing cytochemical stains.
2. Discuss the principles of the following cytochemical stains:
 - Periodic Acid Schiff
 - Peroxidase
 - Sudan Black
 - NASDA/NASDA-F
 - Non-specific esterase
 - Chloracetate esterase
 - Acid Phosphatase (TRAP)
3. Interpret correctly the results from each of the stains listed in objective #2.
4. Evaluate the expected results for each of the stains listed in objective #2 for the following disease states:
 - Acute Lymphocytic Leukemia
 - Acute Myelocytic Leukemia (M0, M1, M2, M3)
 - Acute Myelomonocytic Leukemia
 - Acute Monocytic Leukemia
 - Erythroleukemia
 - Acute Megakaryoblastic Leukemia

5. Compare and contrast the expected staining reactions for the stains listed in objective #2 for the following:
 - o Normal myeloid cell series
 - o Normal lymphocytes
 - o Normal monocytes
 - o Normal platelets, megakaryocytes
 - o Normal nucleated RBC's

Leukocyte Alkaline Phosphatase Stain

Objectives

Upon successful completion of the clinical practicum, studying assigned materials, and reviewing materials associated with the course objectives from MEDT 375, 404/414, and 405/415, the student will:

1. Explain the principle in the Leukocyte Alkaline Phosphatase (LAP) staining procedure.
2. Explain the procedure involved in the LAP stain.
3. Explain the necessity of staining a normal control slide with each set of patient slides.
4. Explain the necessity for establishing a normal range for each laboratory.
5. Discuss the importance of the LAP test in distinguishing a leukemic myeloid process from a non-leukemic myeloid reaction.
6. Evaluate the disease (condition) based on the LAP score.
7. Perform correctly the LAP staining procedure according to laboratory protocol.
8. Report correctly a Kaplow score according to laboratory protocol.

Manual Platelets

Objectives

Upon successful completion of the clinical practicum, studying assigned materials, and reviewing materials associated with the course objectives from MEDT 375, 404/414, and 405/415, the student will:

1. State the normal reference range for a platelet count.
2. Explain the method for diluting a specimen for a manual platelet count.
3. Perform correctly a dilution of a specimen for a manual platelet count according to laboratory protocol.
4. State the reason for using ammonium oxalate as the unopette diluent.
5. Clarify the method employed in counting the platelet count.
6. State the type of hemocytometer used, type of microscope used, area of hemocytometer counted, and the factor for performing a manual platelet count.
7. Describe the method employed in doing a platelet estimate.
8. Compare the platelet count and estimate, to determine if they correlate.
9. Discuss the principle of the phase microscope.
10. Discuss disease states that may have abnormal platelet counts or morphology.
11. Explain how the patient's hematocrit and the thickness of the smear can affect the platelet estimate.
12. Perform correctly manual platelet counts according to laboratory protocol.

*Objectives are considered electives or enhancements to the basic clinical practicum educational experience.

Urine Hemosiderin*

Objectives

Upon successful completion of the clinical practicum, studying assigned materials, and reviewing materials associated with the course objectives from MEDT 375, 404/414, and 405/415, the student will:

1. Define urine hemosiderin.
2. Discuss the significance of urine hemosiderin, including how it is formed.

3. Clarify the procedure involved in the smear preparation.
4. Explain the principle of the Prussian Blue stain.
5. Examine correctly any specimens received for urine hemosiderin.
6. Explain the procedure for performing a Prussian Blue stain.
7. Perform correctly the procedure for a Prussian Blue stain.
8. Discuss the importance of filtering reagents for a Prussian Blue stain.
9. State the procedure for specimen collection.

Nasal Smears*

Objectives

Upon successful completion of the clinical practicum, studying assigned materials, and reviewing materials associated with the course objectives from MEDT 375, 404/414, and 405/415, the student will:

1. Discuss the importance of nasal smears.
2. Explain the procedure used to collect the specimens.
3. Clarify the procedure used to prepare and stain the smears.
4. Summarize the smear examination procedure.
5. Examine correctly any nasal smears that are available.

VIII. COAGULATION

Introduction

Laboratory tests performed in the coagulation laboratory evaluate hemostatic balance of the patient. Hemostatic imbalance can increase the risk of hemorrhage or thrombosis formation.

Prerequisite

The student should review the laboratory procedure manual for the performance and reporting of coagulation results.

Objectives

Upon successful completion of the clinical practicum, studying assigned materials, and reviewing materials associated with the course objectives from MEDT 375, 404/414, and 405/415, the student will:

1. Explain platelet function following subendothelial exposure, including the steps involved in adhesion, release, and aggregation.
2. State site of production of the proteins involved in coagulation, including factor VIII:C and factor VIII:VWF.
3. Discuss the coagulation factors dependent on vitamin K for their complete synthesis.
4. Discuss the role of vitamin K in the hepatic synthesis of these factors indicated in objective #3.
5. List the coagulation factors that are components of the intrinsic system.
6. Describe the coagulation factors that are components of the extrinsic system.
7. Describe how the extrinsic system is initiated *in vivo*.
8. Explain the action and function of antithrombin and its relationship to heparin.
9. Clarify the function of protein C including site of production and the clinical significance of a protein C deficiency.
10. Name components of hemostatic function that are measured by the bleeding time.
11. Explain the principle of platelet aggregometry including the most common substances that either aggregate platelets directly or induce the release of platelet ADP.
12. Discuss the principle of the prothrombin time (PT) test including reagents used and their major components, methodology, coagulation factors measured, and normal reference range.
13. Compare prolonged prothrombin times with clinical conditions and/or disease states.
14. Discuss the purpose of the International Normalized Ratio (INR) for reporting prothrombin time test results for patients who are undergoing oral anticoagulant therapy.
15. Given the patient's prothrombin time and the International Sensitivity Index (ISI), calculate correctly the INR.

16. Discuss the principle of the activated partial thromboplastin time (APTT) test including reagents used and their major components, methodology, coagulation factors measured, and normal reference range.
17. Compare prolonged activated partial thromboplastin times with clinical conditions and/or disease states.
18. Discuss the principle of "mixing studies" performed on patients with prolonged PT and/or APTT results.
19. Discuss what is indicated when a prolonged patient APTT is "corrected" by the addition of normal plasma and what is indicated when a prolonged patient APTT is not "corrected" by the addition of normal plasma.
20. Compare and contrast the principle of specific coagulation factor assay tests.
21. Discuss the principle of the thrombin time test, including reagents used and methodology.
22. Explain the principle of quantitative fibrinogen determinations using a modification of the thrombin time test, including reagents used and normal reference range.
23. Correlate abnormal quantitative fibrinogen results with clinical conditions and/or disease states.
24. Discuss the effect of the lupus-like anticoagulants on the PT, APTT, factor assay, and mixing studies.
25. Indicate the action of lupus-like anticoagulants on both *in vivo* and *in vitro* coagulation systems.
26. Compare the principles of the laboratory tests used most frequently to diagnose von Willebrand's Disease for bleeding time, PT, APTT, factor VIII:C assay, factor VII, ristocetin cofactor activity, factor VIII:VWF antigen, and platelet aggregation studies.
27. Compare patterns of inheritance for hemophilia A and hemophilia B.
28. State the specific factor deficiency for each disorder: hemophilia A and hemophilia B.
29. Explain the effect of circulating factor VIII:C antibodies on hemophilic patients.
30. Explain the effect of vitamin K deficiency on PT and APTT results.
31. Clarify the effect of coumarin compounds on the synthesis and activation of the vitamin K-dependent coagulation factors.
32. Discuss the rationale for coumarin therapy, including the mode of administration.
33. State optimal therapeutic range of the PT for patients on coumarin therapy.
34. Describe the effect of coumarin therapy on the APTT.
35. Explain the uses of therapeutic heparin and the effect this anticoagulant has on coagulation tests.
36. Discuss the process of disseminated intravascular coagulation, including differentiating laboratory tests.
37. List common clinical problems associated with excessive activation on the extrinsic pathway.
38. Explain the effect of DIC on antithrombin, protein C, coagulation factor and platelet levels.
39. Explain why examination of a peripheral blood smear is important when DIC is suspected.
40. Compare and contrast the type of expected coagulation results (D-dimers, PT, APTT, thrombin time, platelet count, fibrinogen) in patients with DIC and associated fibrinolysis who are bleeding.
41. Discuss different endpoint detection methodologies used to detect clot formation by coagulation analyzers.
42. Explain the significance of improperly filled sodium citrate (blue top) tubes.
43. Describe the proper steps to be taken when the situation in objective #42 arises.
44. Explain the principle of the D-dimers test, the significance of elevated levels of D-dimers, and the importance of a negative D-dimers in terms of deep venous thrombosis.
45. Discuss the laboratory procedures used in the determination of Factor V Lieden, APC resistance, Prothrombin mutation and hyperhomocysteinemia.
46. Interpret coagulation results in relation to pathological conditions.
47. Discuss the clinical and laboratory implications of aspirin resistance.
48. Discuss the clinical and laboratory implications of clopidogrel resistance.
49. Explain the significance of reticulated platelets.
50. Discuss the components of thromboelastography (TEG[®]) (e.g., R time, K time, maximum amplitude, clot lysis at 30 minutes).
51. Perform correctly coagulation procedures (e.g., PT, APTT, fibrinogen, factor assays) according to laboratory protocol.

IX. MOLECULAR DIAGNOSTIC and IMMUNOLOGIC ASSAYS

Introduction

Molecular diagnostic testing is used for the diagnosis, prognosis, and monitoring of various hematopoietic and coagulation disorders.

Prerequisite

The student should review the laboratory procedure manual for the performance and reporting of various molecular diagnostic assays.

Objectives

Upon successful completion of the clinical practicum, studying assigned materials, and reviewing materials associated with the course objectives from MEDT 375, 390/391, 404/414, and 405/415, the student will:

1. Identify each molecular diagnostic assay utilized in the affiliate hematology laboratory.
2. Explain the principle of each assay listed in objective #1.
3. Discuss the clinical significance for each assay listed in objective #1, (e.g., impact on diagnosis or treatment of associated disease).
4. Perform correctly molecular diagnostic assays according to manufacturer's directions.
5. List the assays and corresponding analytes in the affiliate's hematology laboratory that utilize diagnostic immunologic techniques.
6. Explain the principle of each assay listed in objective #5.
7. Discuss the clinical significance for each assay listed in objective #5, (e.g. impact on diagnosis).
8. Perform correctly immunological assays according to manufacturer's directions.

ASSESSMENT TOOLS

See below for:

Clinical Practicum Student Affective Evaluation Grading Scale

Clinical Practicum Practical Evaluation Instructions

Clinical Practicum Practical Evaluation Grading Rubric

Clinical Practicum Student Evaluation

Clinical Practicum Student Affective Evaluation Grading Scale:

Instructions: For items #1 through #15: Rate on 1 - 5 point scale below. Record rating in the column provided.

Space is provided with each evaluation item for narrative appraisal. Any unsatisfactory evaluation **must** be documented. Please indicate strong points exhibited. **The completed evaluation form must be discussed with the student at mid-point and end of the clinical practicum.**

Performance Level	Rating Value	Performance Indicators
Outstanding	5	Contribution far exceeds what is normally expected of a student. Personal commitment to a high level of performance and professionalism is clear.
Exceeds Expectations	4	Seizes initiative in development and implementation of challenging projects. Accomplishments exceed requirements. Requires minimal direction
Fully Satisfactory	3	Performance is what is expected in senior clinical practicum. Does not require significant improvement. Errors are minimal and seldom repeated. Requires only normal supervision and follow-up.
Less Than Satisfactory	2	Performance generally does not meet minimum requirements for senior clinical practicum. Errors are significant and frequently repeated. Requires close surveillance and guidance.
Unacceptable Performance	1	Has had sufficient exposure to have shown better performance. Does not grasp basic concepts no matter how many times they have been explained. Does not demonstrate commitment to this aspect of professional development.

Practical Evaluation Instructions
Eval by: _____

Student: _____
Date: _____

Clinical Hematology Practical

INSTRUMENT _____

As detailed in the practical evaluation rubric, perform the following functions:

1. Perform daily maintenance procedures according to protocol.
3. Run controls and patient samples.
4. Evaluate acceptability of controls.
5. Interpret patient results.
6. Perform accurate differential analysis on assigned blood smear slides.
7. Perform accurate manual testing as assigned.
8. Conditions - The following conditions apply to this practical (all that are marked with a v):

___ Time limit = _____

___ Use of Instrument Operating Manuals is permitted

___ Use of course manuals is permitted

___ Other: Please describe _____

Clinical Hematology Practical Evaluation Grading

Eval by: _____

Student: _____

Date: _____

Separate into pre-analytical, analytical, post analytical.	TOTAL POINTS POSSIBLE:	TOTAL POINTS EARNED:	COMMENTS:
Instrument startup completed accurately and efficiently, all necessary documentation accurately and legibly recorded	10		Pre
Reagents and supplies utilized efficiently, no unnecessary waste of materials Proper documentation of reagent handling (i.e., expiration dates, etc.)	5		Pre
Proper performance and documentation of preventative maintenance and troubleshooting procedures	5		Pre
Temperatures of reagent refrigerators, incubators, etc. documented accurately and legibly	5		Pre
Evaluate specimen integrity (i.e., specimen clotted, hemolyzed, QNS, etc.) by lab policy.	10		Pre
Appropriate QC processed, accurately evaluated, and documentation recorded accurately and legibly on instrument or LIS (i.e., identification of trends, shifts, etc.)	15		Pre
Troubleshooting error messages, delta checks, or other instrument "needs" as applicable	5		Analytical
Unknown samples processed and accurately evaluated and reported	25		Analytical
Critical results noted and reported appropriately, all necessary documentation recorded accurately and legibly	15		Analytical and Post analytical
If applicable, verify calculations	5		Analytical
Other			
TOTALS:			
PRACTICAL GRADE:			

UNIVERSITY OF DELAWARE
DEPARTMENT OF MEDICAL LABORATORY SCIENCES
MEDT475 CLINICAL LABORATORY PRACTICUM - STUDENT EVALUATION

Student's Name: _____

Affiliate Site: _____

Discipline: **HEMATOLOGY**

Signature of Evaluator(s): _____

Date of Mid Evaluation: _____
 (due at the end of the first two weeks of the clinical practicum period)

Date of Final Evaluation: _____
 (due at the completion of the clinical practicum period, please mail completed evaluation to UD coordinator)

Affective Evaluation

5 = Outstanding *Far exceeds expectations* 2 = Below expectations *No self-motivation*
 4 = Exceeds expectations *Seizes initiative* 1 = Unacceptable performance *No commitment*
3 = Fully satisfactory Meets expectations Please circle score below and add comments for all scores below/above "3":

1. **Dress Code:** (Obj. #1) Complies with the established dress code policy as outlined in the clinical practicum guidelines; gives evidence of good grooming.

5	4	<u>MID</u> 3	2	1		5	4	<u>FINAL</u> 3	2	1
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Comments: _____

2. **Punctuality & Attendance:** (Obj. #2, 3, 4) Arrives in the laboratory with adequate time to start as scheduled. Returns from breaks as scheduled. Complies with attendance policy; notifies appropriate personnel at affiliate and University in a timely fashion.

5	4	<u>MID</u> 3	2	1		5	4	<u>FINAL</u> 3	2	1
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Comments: _____

3. **Safety:** (Obj. #11) Adheres to laboratory safety regulations; works in an orderly and safe manner.

5	4	<u>MID</u> 3	2	1		5	4	<u>FINAL</u> 3	2	1
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Comments: _____

4. **Attention:** (Obj. #5, 6, 19) Follows both verbal and written instructions. Asks pertinent questions when necessary. Neither distracts others nor allows distractions to affect the completion of assignment.

5	4	<u>MID</u> 3	2	1		5	4	<u>FINAL</u> 3	2	1
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Comments: _____

5. **Independence:** (Obj. #7) Demonstrates the ability to work independently within student guidelines. Student draws on previously gained knowledge to solve problems. Student seeks activities to expand knowledge, ability and performance.

5	4	<u>MID</u> 3	2	1		5	4	<u>FINAL</u> 3	2	1
---	---	-----------------	---	---	--	---	---	-------------------	---	---

Comments: _____

6. **Interpersonal Skills:** (Obj. #8, 18) Communicates in a professional, tactful manner with instructors, staff, other health care personnel, patients and visitors. Consistently shows common courtesy and contributes toward achieving an environment conducive to work and learning for self and others.

5	4	<u>MID</u> 3	2	1		5	4	<u>FINAL</u> 3	2	1
---	---	-----------------	---	---	--	---	---	-------------------	---	---

Comments: _____

FINAL CLINICAL PRACTICUM GRADE REPORT

Please provide scores and a description for the written assessments and practical below – the UD Clinical Education Coordinator will calculate the final grade based upon these scores and the affective score. Thank you.

Written Assessment(s) – please include brief description below	QUIZ grades	TEST grades	PROJECT grades
Practical – please include brief description of practical below	Practical Score achieved _____		

Description of Written Assessment Tools and Practical:

Additional Instructor Comments: _____

Mid Evaluation

Signature of student _____ Date _____

Final Evaluation

Signature of student _____ Date _____

Student Comments: _____

STOP – Grade will be calculated by the UD Education Coordinator. Thank you 😊

Student Affective Evaluation 20%

Average Points: $\frac{\text{total points}}{15} = \text{_____} = \text{_____}$

Look up grade below: _____ X 20% = _____

Example: $52/15 = 3.47 = \text{B-}$ (80 x 20%) = **16**

Average points = grade: Average points = grade:

5.00 – 4.50 = A = 95	2.49 – 2.00 = C- = 70
4.49 – 4.00 = A- = 90	1.99 – 1.50 = D = 65
3.99 – 3.50 = B = 85	1.49 – 1.00 = D- = 60
3.49 – 3.00 = B- = 80	<1.00 = F = 55
3.00 – 2.50 = C = 75	

Written Assessment Ave. Score _____ X .40 = _____

Practical Score _____ X .40 = _____

Affective Score _____ X .20 = _____

Grade for Practicum = _____

PASS or FAIL

UD end-of-rotation exam grade _____